U. S. FOREST SERVICE

RESEARCH NOTE LS-73

LAKE STATES FOREST EXPERIMENT STATION • U. S. DEPARTMENT OF AGRICULTURE

St. Paul Campus, University of Minnesota, St. Paul, Minn. 55101

Botanical and Commercial Range of White Spruce in the Lake States

Accurate maps showing the distribution of important tree species are valuable to foresters, botanists, wildlife specialists, land managers, and others. Although the general natural ranges for our principal tree species have been well known for some time, new information continues to develop. Commercial ranges, however, have not previously been mapped precisely, and artificial extensions of ranges generally have not been mapped at all. For these reasons, range maps of the principal forest tree species have been prepared[1] for the Lake States (Michigan, Minnesota, and Wisconsin), and that for white spruce (*Picea glauca* (Moench) Voss.) is presented here (fig. 1).

Accuracy depends in part on the scale of the map being used. On this map, it is not practical to separate out isolated stands except when they are some distance from the main range. Accordingly, the main range boundary as drawn may include several outliers near the edge of the principal distribution.

In the silvical characteristics reports for the Lake States tree species,[2] commercial ranges were mapped, but they were based on the following broad definition: "Commercial range is defined as that portion of the natural range in which the species grows to commercial size and is a major or important species in the type." In this Note, commercial range is defined on a wood volume basis and is indicated for each county that presently has at least 1,000 cords of white spruce (fig. 1). Counties with 10,000 to 99,000 cords and those with at least 100,000 cords are specially designated. The commercial range is based primarily on published reports of the Forest Survey, supplemented for completeness by unpublished data from the same source.

The natural range of white spruce is based on published reports[3] as modified by the observations of qualified foresters and botanists.[4] A supplemental map (fig. 2) shows the plots used in making the distribution map. These plots were derived from actual herbarium specimens or from other reliable sources.

Within its natural range in the Lake States, white spruce grows best on loamy soils but will also grow well on moist sands and on clays that are neither especially wet nor exceptionally dry. Pure stands more than a few acres in extent are rare in the Lake States, except in plantations. White spruce usually grows with a large number of tree species, the most common of which in the Lake States (in approximate order of frequency in Forest Survey plots) are balsam fir, paper birch, quaking aspen, red maple, northern white-cedar, black spruce, white pine, yellow birch, black ash, balsam poplar, and American elm. Associates vary geographically and according to site conditions. For example, in Michigan sugar maple and eastern hemlock are common associates, in addition to the other species listed.

---

1 *Other published reports in this series are for jack pine (U.S. Forest Serv. Res. Note LS-15, 1963), red pine (U.S. Forest Serv. Res. Note LS-62, 1965), eastern white pine (U.S. Forest Serv. Res. Note LS-63, 1965), and black spruce (U.S. Forest Serv. Res. Note LS-74, 1965).*

2 *See Lake States Forest Experiment Station, Station Paper 67, which includes a list of silvical reports.*

3 *Dodge, C. K., Miscellaneous papers on the botany of Michigan, Publ. 31, Biol. Series 6, Mich. Geol. and Biol. Survey, 1921. Fassett, Norman C., Preliminary reports on the flora of Wisconsin, V. Coniferales, Wis. Acad. Sci., Arts and Letters, Trans. 25:177-182, illus., 1930. Nienstaedt, Hans, Silvical characteristics of white spruce, U.S. Forest Serv., Lake States Forest Expt. Sta., Sta. Paper 55, 23 pp., illus., 1963.*

4 *Information in this Note has been reviewed by Drs. Edward Flaccus and Paul Monson, University of Minnesota (Duluth); Dr. Thomas Morley, University of Minnesota (Minneapolis); Dr. Edward G. Voss, University of Michigan; staff members of all Divisions and Field Units of the Lake States Forest Experiment Station; and staff members of all National Forests and State Conservation Departments in Michigan, Minnesota, and Wisconsin.*

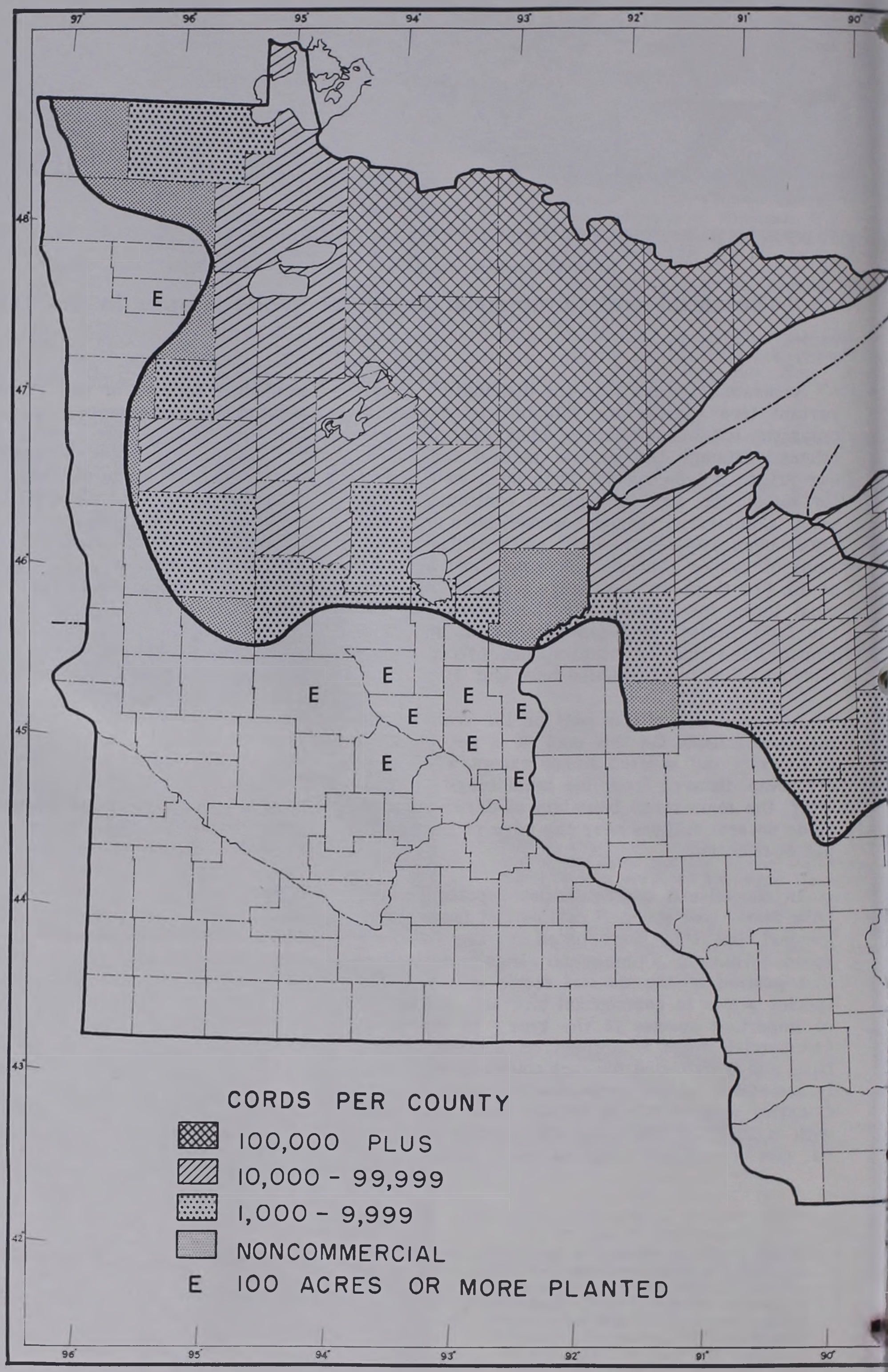
97°
96°
95°
94°
93°
92°
91°
90°
48°
47°
46°
45°
44°
43°
42°
E
CORDS PER COUNTY
100,000 PLUS
10,000 - 99,999
1,000 - 9,999
NONCOMMERCIAL
E 100 ACRES OR MORE PLANTED

FIGURE 1. — Natural and commercial range of white spruce in the Lake States. The natural range includes the areas within the heavy line. Arrows point to isolated stands at some distance from the main range. The commercial range includes all counties within the natural range that have at least 1,000 cords of white spruce.

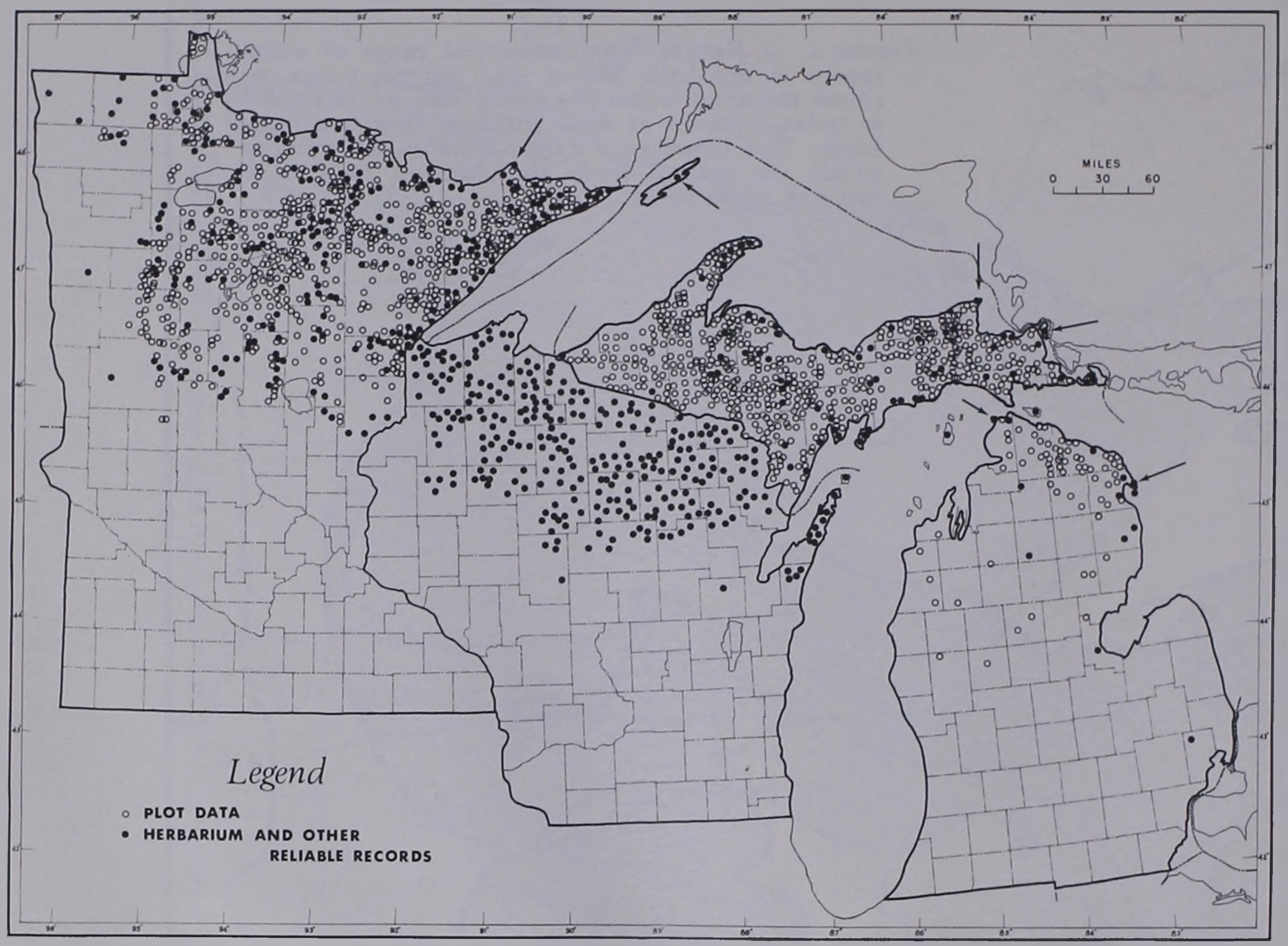

FIGURE 2. — Localities from which native white spruce is represented in established herbaria or other valid records.*

* Includes material from (1) the following herbaria: Cranbrook Institute of Science, Michigan State University, Milwaukee Public Museum, University of Michigan, University of Minnesota (Duluth), University of Minnesota (Minneapolis), University of Wisconsin (Madison), and University of Wisconsin (Milwaukee); (2) seed collection records of the Lake States Forest Experiment Station, the University of Minnesota, and Michigan State University; (3) superior tree records of the Lake States Forest Experiment Station; (4) seed production areas on record at the Lake States Forest Experiment Station; (5) a vegetational survey made by Dr. Egolfs Bakuzis, of the University of Minnesota; and (6) Fassett, 1930(see footnote 3), for most of the Wisconsin locations.

Although the natural distribution of white spruce is outlined on figure 1, planting is beginning to extend the range and eventually may blur the outlines of the natural range. Where planting has been extensive enough to develop at least 100 acres per county of established stand, it has appeared in Forestry Survey statistics. Data have also been obtained from nursery distribution records and other State forestry sources. Stands of this extent beyond the known botanical range are shown by an "E" in the counties involved. Planting within the botanical distribution may increase the commercial range.

PAUL O. RUDOLF, Principal Silviculturist
Lake States Forest Experiment Station

JOHN W. ANDRESEN[5], Head, Department of Forestry, Southern Illinois University

December 1965

[5] *Formerly Associate Professor at Michigan State University.*